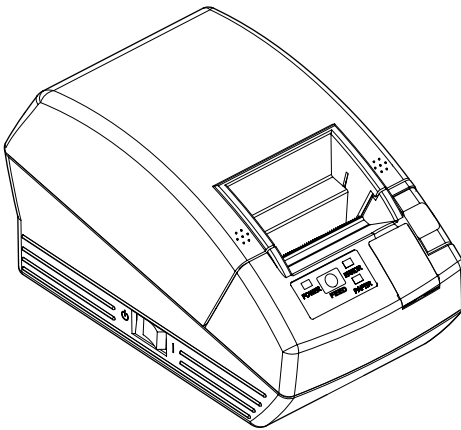


LINE THERMAL PRINTER

MODEL CT-S281

User's Manual



CITIZEN SYSTEMS JAPAN CO., LTD.

Declaration of Conformity

This printer conforms to the following Standards:

The Low Voltage Directive 2006/95/EC, the EMC Directive 2004/108/EC, the RoHS Directive 2002/95/EC, and the WEEE Directive 2002/96/EC.

LVD : EN60950-1

EMC : EN55022 Class B
EN61000-3-2
EN61000-3-3
EN55024

This declaration applies only to the 230-V model.

IMPORTANT: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

CAUTION: Use shielded cable for this equipment.

Sicherheitshinweis

Die Steckdose zum Anschluß dieses Druckers muß nahe dem Gerät angebracht und leicht zugänglich sein.

For Uses in Canada

This digital apparatus does not exceed the class B limits for radio noise emissions from digital apparatus, as set out in the radio interference regulations of the Canadian department of communications.

Pour L'utilisateurs Canadiens

Cet appareil numérique ne dépasse pas les limites de catégorie A pour les émissions de bruit radio émanant d'appareils numériques, tel que prévu dans les règlements sur l'interférence radio du département Canadien des communications.

GENERAL PRECAUTIONS

- Before using this product, be sure to read through this manual. After having read this manual, keep it in a safe, readily accessible place for future reference.
- The information contained herein is subject to change without prior notice.
- Reproduction or transfer of part or all of this document in any means is prohibited without permission from CITIZEN SYSTEMS.
- Note that CITIZEN SYSTEMS is not responsible for any operation results regardless of missing, error, or misprinting in this manual.
- Note that CITIZEN SYSTEMS is not responsible for any trouble caused as a result of using options or consumables that are not specified in this manual.
- Except explained elsewhere in this manual, do not attempt to service, disassemble, or repair this product.
- Note that CITIZEN SYSTEMS is not responsible for any damage attributable to incorrect operation/handling or improper operating environments that are not specified in this manual.
- Data are basically for temporary use, not stored for a long period or permanently. Please note that CITIZEN SYSTEMS is not responsible for damage or lost profit resulting from the loss of data caused by accidents, repairs, tests or other occurrence.
- If you find loss of information, error, or uncertain matter, please contact your CITIZEN SYSTEMS dealer.
- If you find any disordered or missing page(s), contact your CITIZEN SYSTEMS dealer for replacement.

SAFETY PRECAUTIONS ... WHICH SHOULD BE STRICTLY OBSERVED

Before using this product for the first time, carefully read these SAFETY PRECAUTIONS. Improper handling may result in accidents (fire, electric shock or injury).

In order to prevent injury to operators, third parties, or damage to property, special warning symbols are used in the User's Manual to indicate important items to be strictly observed.

- After having read this Manual, keep it in a safe, readily accessible place for future reference.
- Some of the descriptions contained in this manual may not be relevant to some printer models.

The following describes the degree of hazard and damage that could occur if the printer is improperly operated by ignoring the instructions indicated by the warning symbols.

WARNING

Neglecting precautions indicated by this symbol may result in fatal or serious injury.

CAUTION

Neglecting precautions indicated by this symbol may result in injury or damage to properties.



This symbol is used to alert your attention to important items.



This symbol is used to alert you to the danger of electric shock or electrostatic damage.



This symbol denotes a request to unplug the printer from the wall outlet.



This symbol is used to indicate useful information, such as procedures, instructions or the like.



This symbol is used to indicate prohibited actions.

PRECAUTIONS ON PRINTER INSTALLATION

WARNING

■ Do not use or store this product in a place where it will be exposed to:

- * Flames or moist air.
- * Direct sunlight.
- * Hot airflow or radiation from a heating device.
- * Salty air or corrosive gases.
- * Ill-ventilated atmosphere.
- * Chemical reactions in a laboratory.
- * Airborne oil, steel particles, or dust.
- * Static electricity or strong magnetic field.

• **Neglecting these warnings may result in printer failure, overheating, emission of smoke, fire, or electric shock.**



■ Do not drop any foreign object nor spill liquid into the printer. Do not place any object on the printer either.

■ Do not drop any metallic object such as paper clip, pin or screw into the printer.

■ Do not place a flower vase, pot or cup containing water on the printer.

■ Do not spill coffee, soft drinks or any other liquid into the printer.

■ Do not spray insecticide or any other chemical liquid over the printer.

• **A metallic foreign object, if accidentally dropped into the printer, may cause printer failure, fire, or electric shock. Should it occur, immediately turn the printer off, unplug it from the supply outlet, and call your local Citizen Systems dealer.**



Do not handle the printer in the following ways:

■ Do not allow the printer to sustain strong impacts or hard jolts (e.g., trampling, dropping, striking with a hard edge).

■ Never attempt to disassemble or modify the printer.

• **Neglecting to handle properly may result in printer failure, overheating, emission of smoke, fire, or electric shock.**



■ Install, use, or store the printer out of the reach of children.

• **Electric appliances could cause an unexpected injury or accident if they are handled or used improperly.**

• **Keep the power cord and signal cables out of the reach of children. Also children should not be allowed to gain access to any internal part of the printer.**

• **The plastic bag the printer came in must be disposed of properly or kept away from children. Wearing it over the head may lead to suffocation.**



CAUTION

Do not use the printer under the following conditions.

- A state subject to vibration or unstable state.
- A state with this product slanted.
 - **Otherwise dropping may cause injury.**
 - **Poor print quality may occur.**
- A state where the printer ventilation holes are obstructed by a nearby wall or other equipment.
- A state where any object is placed on the printer
- A state where the printer is covered or wrapped by a cloth or bed clothing
 - **Be careful about internal heat buildup, which could cause fire and deform the case.**
- Avoid using the printer near a radio or TV set or from supplying it from the same outlet as these appliances.
- Avoid using the printer interconnected with a cable or cord that has no protection against noise. (For interconnections, use shielded or a twisted pair of cables and ferrite cores, or other anti-noise devices.)
- Avoid using the printer with a device that is a strong source of noise.
 - **The printer may have an adverse effect on nearby radio or TV transmissions. There may also be cases when nearby electrical appliances adversely influence the printer, causing data errors or malfunction.**
- A state where this product is installed vertically or sidelong.
 - **Malfunction, failure, or electric shock may result.**



- Use the printer with its grounding post connected to a convenient grounding facility.
 - **If leakage occurs electric shock may result.**
- Do not connect the printer's grounding post onto any of the following facilities:
 - * Utility gas piping
 - **A gas explosion could result.**
 - * Telephone line ground
 - * Lightning rod
 - **If lightning strikes a large surge of current may cause fire or shock.**
 - * Utility water pipes
 - **Plastic water pipes should not be used for grounding. (Those approved by a Waterworks Department may be used.)**
- Before connecting or disconnecting the grounding lead to or from the printer, always unplug it from supply outlet.



PRECAUTIONS IN HANDLING THE PRINTER

WARNING

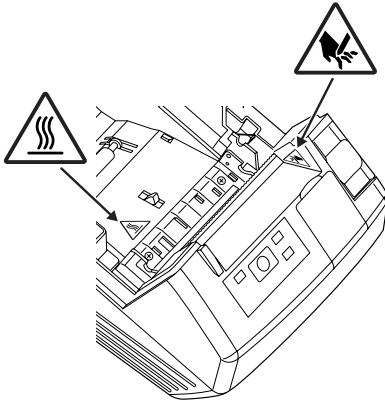
Please observe the following precautions for power source and power cord:

- Do not plug or unplug the power cord with a wet hand.
- Use the printer only at the specified supply voltage and frequency.
- Use only the specified AC adapter with the printer.
- Check to make sure that the supply outlet from which the printer is powered has a sufficient capacity.
- Do not supply the printer from a power strip or current tap shared with other appliances.
- Do not plug the power cord into a supply outlet with dust or debris left on its plug.
- Do not use a deformed or damaged power cord.
- Do not move the printer while the printer power is on.
- **Neglecting to handle properly may result in printer failure, emission of smoke, fire, or electric shock.**
- **An overload may cause the power cord to overheat or fire or the circuit breaker to trip.**
- Do not allow anything to rest on the power cord. Do not place the printer where the power cord will be trampled on.
- Do not use or carry the printer with its power cord bent, twisted, or pulled.
- Do not attempt to modify the power cord unnecessarily.
- Do not lay the power cord in the neighbor of a heating device.
- **Neglecting these cautions may cause wires or insulation to break, which could result in leakage, electric shock, or printer failure. If the power cord sustains damage, contact your Citizen Systems dealer.**
- Do not leave things around the supply outlet.
- Supply power to the printer from a convenient wall outlet, readily accessible in an emergency.
- **The printer may not be immediately shut down in an emergency.**
- Insert the power plug fully into the outlet.
- If the printer will not be used for a long time, leave it disconnected from its supply outlet.
- Hold the plug and connector when plugging or unplugging the power cord or signal cable after turning off the printer and the appliance connected to it.



CAUTION

Caution label is attached on the position shown in the following figure. Carefully read the precautions in handling before using the printer.

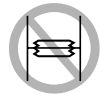


THESE LABELS INDICATE THE RISK OF ANY INJURY DUE TO "HIGH TEMPERATURE" OF THE PRINT HEAD AND "SAW-TOOTHED EDGE" OF THE MANUAL CUTTER.

- Do not transport this printer with the paper roll inside.
- **Printer failure or breakage may occur.**

To prevent possible malfunction or failure observe the following.

- Avoid operating the printer without paper properly loaded.
- Avoid the use of paper not complying with specifications.
- **May result in poor print quality.**
- Avoid using torn pieces of paper or spliced with plastic adhesive tapes.
- Avoid forcibly pulling already loaded paper by hand.
- Avoid wedging the paper into the printer.
- **May jam paper. To release, refer to "Removing Jammed Paper" in this manual.**
- Avoid using a sharp pointed device to operate panel keys.



- Be sure to firmly insert the cable plug into its mating socket.
- **A cross connection may damage the printer's internal electronics or the host system's hardware.**
- Only use the printer with devices that have designated solenoid specifications for the cash drawer interface connector.
- **Neglecting this caution may result in malfunction or failure.**



CAUTION

To prevent injury and printer failures from worsening, observe the following:

- Do not touch the printing surface of the thermal head.
- Do not touch any of the moving parts (e.g., paper cutter, gears, active electrical parts) while the printer is working.
- In case of trouble do not attempt to repair the printer. Ask Citizen Systems service for repair.
- Be careful that the printer cover does not entrap your hands or fingers.
- Be careful with sharp edges on the printer. Do not allow them to injure you or damage property.
- **May result in electric shock, burn, or injury.**



If the printer emits smoke, an odd smell, or unusual noise while printing, immediately abort the current print session and unplug the printer from the supply outlet.

DAILY MAINTENANCE

Observe the following precautions for daily maintenance.

- When cleaning the printer, always turn it off and unplug it from the supply outlet.
- Use a soft, dry cloth for cleaning the surface of the printer case.
- For severe stains, use a soft cloth slightly dampened with water.
- Never use organic cleaning solvent such as alcohol, paint thinner, trichloroethylene, benzene, or ketone. Never use a chemically processed cleaning cloth.
- To remove paper dust, use a soft brush.
- When transporting the printer, remove the paper roll from the printer.



CAUTION

- **The thermal head is at a dangerously high temperature immediately after printing. Allow it to cool off before launching maintenance work.**

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1. GENERAL OUTLINE

The CT-S281 is a thermal line printer designed for use with a broad array of terminal equipment including, data, POS, and kitchen terminals. With extensive features, it can be used in a wide range of applications.

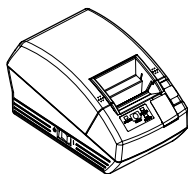
1.1 Features

- Compact design.
- The printer allows horizontal or wall mounting installation.
- Auto Cutter provided as a standard unit (performs full cut or partial cut).
- Paper drop-in mechanism facilitating easy paper handling and head cleaning.
- Highly reliable printer mechanism.
- High speed printing with 80 mm/s (60 mm/s at label print mode).
- Fast graphic printing.
- Printer class or Virtual COM can be selected for USB port.
- A variety of functions selectable by memory switches.
- Registration of user-defined characters and logos into flash memory.
- Barcode & 2D Barcode printing is supported.
- 2-color printing is supported.
- Can use paper roll with a maximum thickness of 100 μ m.
- Label and Blackmark paper are usable as option (Label printing).

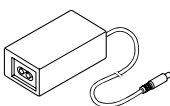
1.2 Unpacking

When unpacking the printer, confirm that the following are provided:

- Printer: 1
- AC adapter: 1
- AC power cord: 1
- Sample paper roll: 1 roll
- USB cable clamp(USB Interface model): 1
- Operation panel(for wall mounting): 1
- Quick start guide: 1
- CD-ROM: 1



Printer



AC adapter



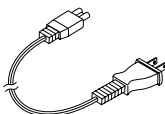
CD-ROM



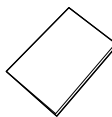
USB cable clamp
(USB Interface model)



Sample paper roll **



AC power cord *



Quick start guide



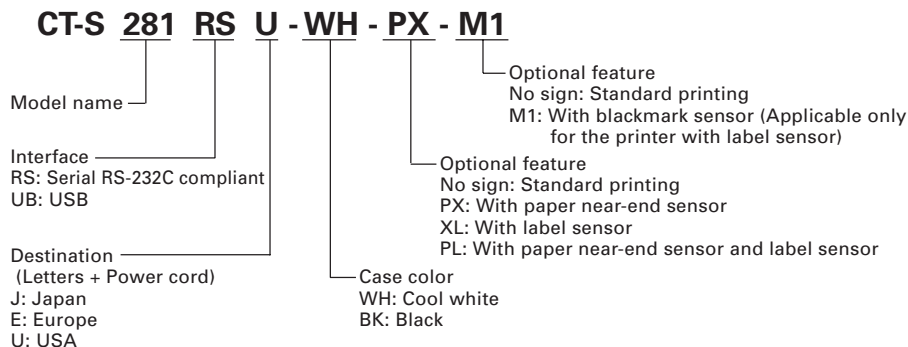
Operation panel
(for wall mounting)

* The AC power cord plug will vary depending of the region.

** In case of label model, Label paper is used for sample paper roll.

1.3 Model Classification

The printer models are classified by the following designation method:



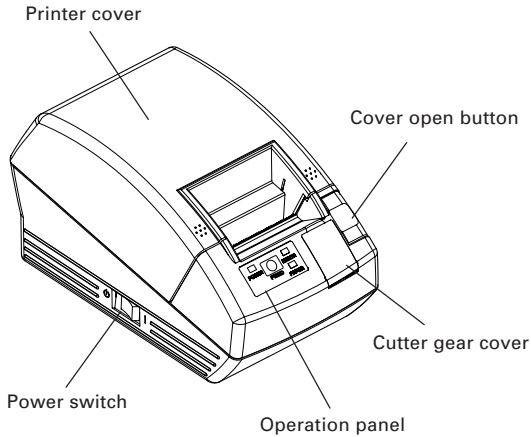
1.4 Basic Specifications

Item	Specifications	
Model	CT-S281RSU CT-S281UBU	CT-S281RSE CT-S281UBE
Print method	Line thermal dot print method	
Print width	48 mm/384 dots	
Dot density	8 (horizontal) × 8 (vertical) dots/mm (203 dpi)	
Print speed	80 mm/s (Fastest, print density: Standard level), 60mm/sec in label printing	
Number of print columns	Font A: 32 columns; 12 × 24 dots horizontal and vertical Font B: 42 columns; 9 × 24 dots Font C: 48 columns; 8 × 16 dots	
Character size	Font A: 1.50 × 3.00 mm Font B: 1.13 × 3.00 mm Font C: 1.00 × 2.00 mm	
Character type	Alphanumeric, International, PC437/850/852/857/858/860/863/ 864/865/866/WPC1252/Katakana/Thai code 18	
User memory	256KB (User-defined characters and logos can be registered)	
Types of bar code	UPC-A/E, JAN (EAN) 13/8 columns, ITF, CODE 39, CODE 128, CODABAR, CODE 93, PDF417, QRCODE	
Line spacing	4.23 mm (1/6 inch) settable with command	
Paper roll	Thermal paper roll: 58 mm × φ83 mm, Label paper: 58 mm × φ80 mm Paper thickness: 0.06 to 0.1 mm	
Interfacing	Serial (RS-232C compliant), USB	
Input buffer	4k bytes/45 bytes	
Supply voltage	DC 8.5 V ±5%	
Power consumption	Standby: Approx. 2 W, Printing: Approx. 18 W (Approx. 26 W max.)	
AC adapter	Rated input: AC 100 to 240 V, 50/60 Hz Rated output: DC 8.5 V, 2.5 A	
Weight	Approx. 630 g	
Outside dimensions	106 (W) × 180 (D) × 105 (H) mm	
Operating temperature and humidity	5 to 40°C, 10 to 85% RH (No condensation)	
Storage temperature and humidity	-20 to 60°C, 10 to 90% RH (No condensation)	
Reliability	Print head life: 50 km, 1 × 10 ⁸ pulses (At normal temperature/ humidity with recommended paper used) Auto cutter life: 1million cuts(At normal temperature/ humidity with recommended paper used)	
Safety standard *	UL, C-UL, FCC Class B	TUV, GS, CE marking

*Represents the safety standards acquired when CITIZEN SYSTEMS-made adapters (28AD series) are used.

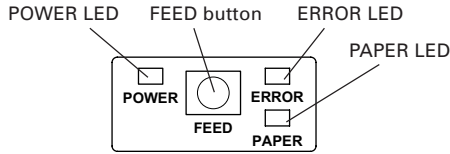
2. EXPLANATION OF PRINTER PARTS

2.1 Printer Appearance



- **Printer cover**
Paper is located inside this cover.
- **Cover open button**
To refill or replace paper, open the paper cover by pushing this button.
- **Power switch**
This switch turns the printer power ON/OFF.
- **Cutter gear cover**
To release the cutter lock, open this cover and rotate cutter gear.

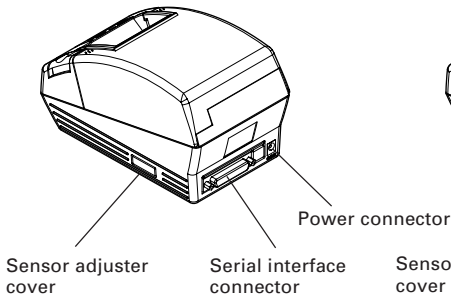
Operation Panel



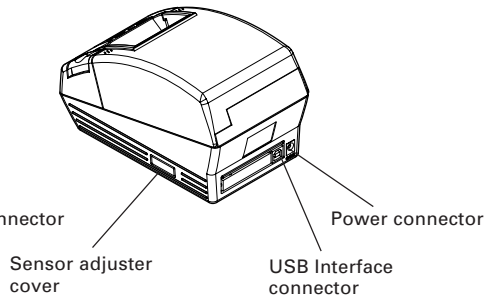
- **POWER LED**
Lights when the printer power is on and goes off when the printer power is off. May blink or light in a special mode or in case of a failure.
- **FEED button**
Pressing this button once causes a paper feed of one line. Pressing the button continuously causes the paper to feed continuously.
- **ERROR LED**
Lights or blinks when paper is empty or in case of a failure. The interval length of blinking shows the type of error.
- **PAPER LED**
Lights when there is no paper or the paper is low with the optional PNE sensor.

Rear Connectors

Serial interface Type

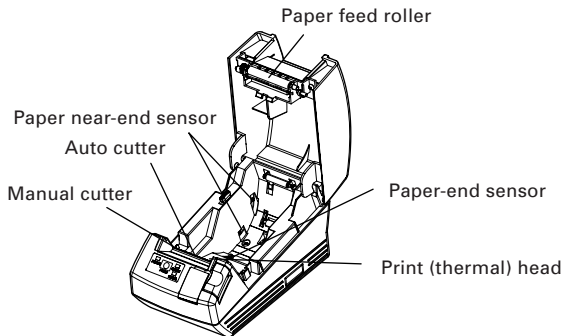


USB interface Type



- **Power connector**
Connects to the cable from AC adapter.
- **USB Interface connector**
Connects to the USB interface cable.
- **Serial interface connector**
Connects to the serial interface cable.
- **Sensor adjuster cover**
When adjusting the Paper sensor, remove this cover.

2.2 Paper Cover Inside



- **Auto Cutter**
Cuts the paper when software command is sent to the printer. Cutting method could be partial cut or full cut, "Partial Only" is set to valid by the default memory switch 4-8, so that the full cut command will execute as partial cut operation.
- **Manual cutter**
Tears the paper by hand.
To cut the printed paper, gently pull the paper from the edge of the paper at the angle so that paper firmly contacts the manual cutter. Improper direction of pull may result in poor cutting or excessive unwinding of paper. In some case, characters may be destroyed at the first printing after the paper is cut.
- **Paper near-end sensor (Factory option)**
If installed, detects when paper roll goes low. The external diameter of paper roll remainder will vary depending on the position of the paper near-end sensor lever.
- **Paper-end sensor**
Stops printing when this sensor detects paper end.
- **Print(thermal)head**
Prints characters and/or graphics data on thermal paper.
- **Paper feed roller**
Feeds paper as part of print mechanism.

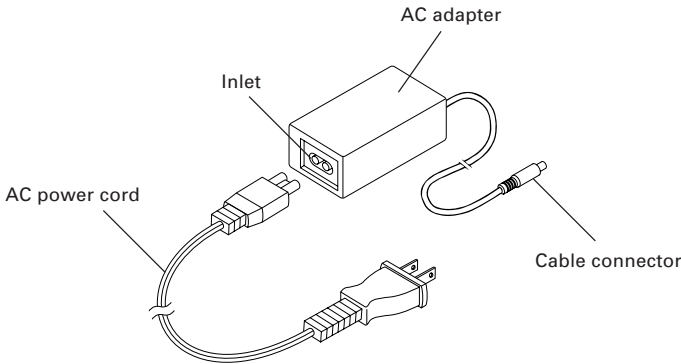
2.3 Other Built-in Functions

- **User memory**
Allows registration of user-defined characters and logo data in nonvolatile memory. Data remain registered even if the printer is OFF.
- **Memory switches**
Allow printer configuration, could be set by software command or manually on the printer, changes remain registered in nonvolatile memory even if the printer is OFF.

3. PREPARATION

3.1 Connecting the AC Adapter and AC Power Cord

1. Turn off the printer power.
2. Plug in the cable connector of the AC adapter to the power connector at the rear of the printer.
3. Connect the AC power cord to the inlet of AC adapter, and insert the AC power-cord plug into a suitable wall outlet.

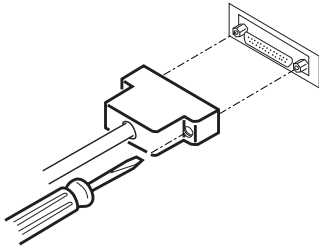


CAUTION!

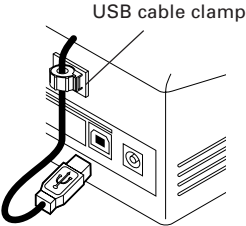
- Use only the specified AC adapter with the printer.
- When disconnecting a cable, do not pull out by the cable. Always hold the plug.
- Always keep the AC power supply away from other noise generating equipment.
- Do not pull the power cord. Otherwise fire, electric shock, or power disconnection may result.
- If lightning is approaching, unplug the AC power cord from the wall outlet. Otherwise fire or electric shock may result.
- Keep the power cord away from heat generating appliances. Otherwise the shield of power cord may be fused resulting in a fire or electric shock.
- If the printer will not be used for a long time, leave it disconnected from its supply outlet.
- Lay the cable not to be caught by the leg or the like.

3.2 Connecting Interface Cables

Turn off the printer and unplug the power connector. Then follow the procedure for interface cable connection. Orient the interface cable terminal correctly and insert it into the interface connector.



Serial Interface



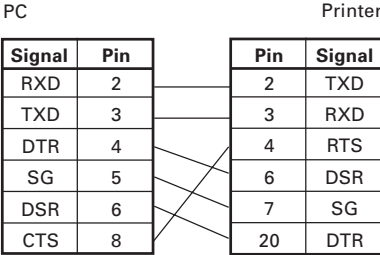
USB Interface

⚠ CAUTION!

- When disconnecting the cable, always hold the connector.
- Lay the cable not to be caught by the leg or the like.

For serial interface use cable with the following configuration:

9-pin - 25-pin cable

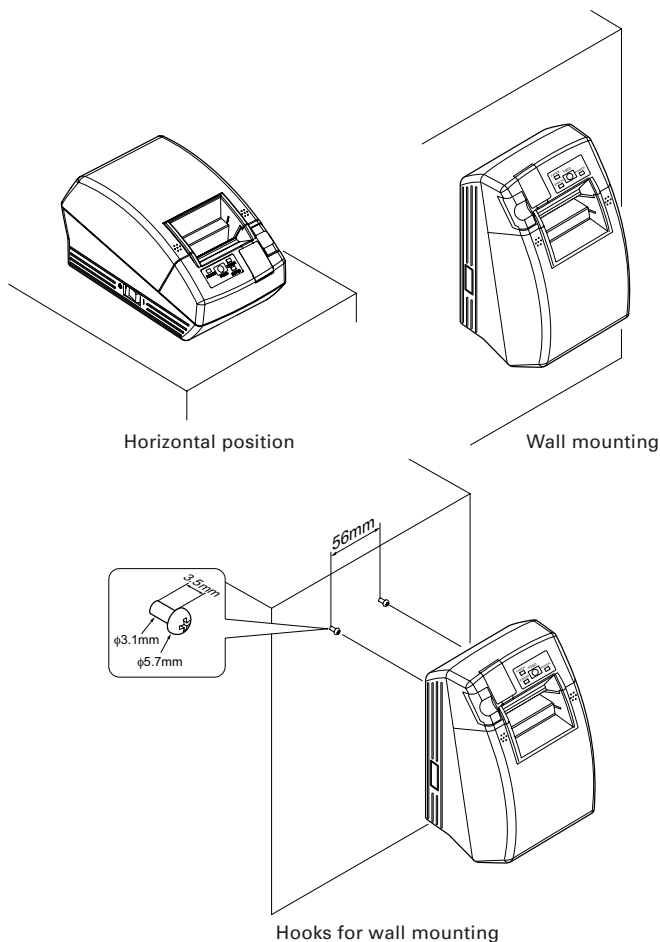


3.3 Installing the Printer

The printer can be installed horizontally or mounted vertically on the wall. At the time of shipment, the printer is set for horizontal installation. To install the printer on the wall, put the accessory operation panel on to the original one. This will allow easy operation panel reading when printer is wall mounted.

CAUTION!

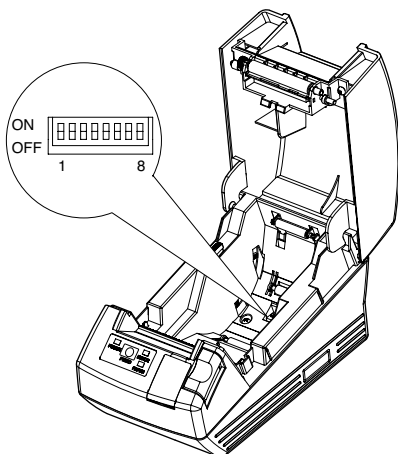
- No screw for wall mounting is provided. Check the structure and strength of the wall (plaster board or stronger one) and prepare two appropriate screws (round-head wood screws of $\phi 3.1$, 16 mm or more). And fix the printer by tightening the screws in accordance with the specified dimensions.



3.4 Setting DIP Switch (Only serial interface type)

DIP switch is provided only for serial interface specification.

The DIP switch is located at the bottom of the paper holder. To set the DIP switch open the printer cover and remove the paper.



Switch No.	Function	ON	OFF	Initial Settings
1	Communication condition setting method	DIP switch setting	Internal memory setting	ON
2	Flow Control	XON/XOFF	DTR/DSR	OFF
3	Bit length	7 bits	8 bits	OFF
4	Parity check	With parity	None	OFF
5	Parity selection	Even parity	Odd parity	OFF
6	Baud rate selection	See Table below.		OFF
7				ON
8	Reserved	-	Fixed	OFF

Selecting baud rate

Baud Rate (bps)	Switch No.	
	6	7
2400	OFF	OFF
4800	ON	OFF
9600	OFF	ON
19200	ON	ON

1200 bps and 38400 bps can also be selected by a command or the memory switch. 9600bps is factory setting.

3.5 Adjusting the Paper Near-end Sensor

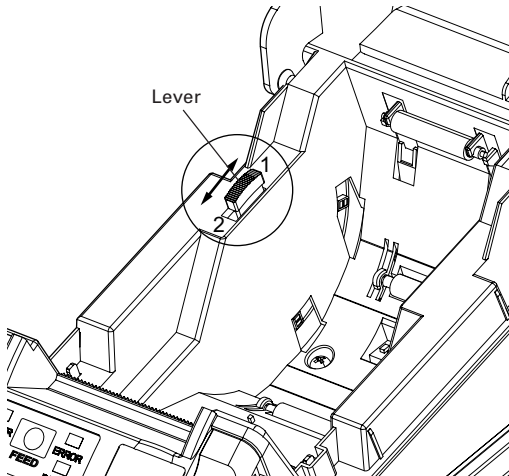
Move the paper near-end sensor lever to forward or backward. The position to be set varies in accordance with the paper roll as shown in the following table.

unit: mm

Lever Position	External Diameter of Paper Roll Remainder
1	$\phi 24$
2	$\phi 34$

CAUTION!

- Paper remainder (outside diameter of roll) differs by the type of paper roll used.
- The external diameter of the paper roll is only for reference.
- In the wall-mount status, you cannot use the paper near-end sensor.
- Not usable for a label paper roll.



3.6 Selecting Paper Type

Paper type selection is available by the combination of memory switches SW4-4 and SW4-5 by the used of "Memory Switch Select Mode". In addition, the following procedure is available.

1 Enter Selecting Paper Type mode.

- 1) Open the printer cover and remove paper. Pressing and holding the FEED button, turn the printer power ON. The POWER LED starts blinking.
- 2) Release the FEED button and then close the printer cover. The paper type currently set is indicated by the LED on the operation panel.

2 Select Paper Type.

Press the FEED button to match the paper type loaded to the LED indications in the table below. (Refer to the table below.)

	POWER LED	ERROR LED
Label	Green lit	(OFF)
Thermal paper roll	(OFF)	Red lit
Black Mark paper	Green lit	Red lit

*PAPER LED is kept lit.

3 Save the selected Paper Type to the Printer.

Open and close the printer cover. By this operation, selected paper type is stored in the printer memory and the Selecting Paper Type mode is terminated. (Then, POWER LED, ERROR LED, and PAPER LED go on.) Since then, "P.Length Set" of Memory switch 4-1 becomes "command".

When closing the printer cover during the setting a Black Mark paper or label paper in the printer, paper length is measured, and the result will be printed out.

- * If Paper Detection error occurs at the measurement of paper length, the printer automatically enters Adjusting Paper Sensor mode. Adjust the sensor in accordance with "3.7 Adjusting Paper Sensor".

3.7 Adjusting Paper Sensor

Before using Black Mark paper (BM paper) or label, adjust the Paper sensor. First remove the Sensor adjuster cover located at the opposite side of the Power switch from the printer.

As shown in Figure 1, Level indicator LED, Black Mark sensor adjuster, and Label paper sensor adjuster are located here in this order from the left. Adjust them in the following procedure.

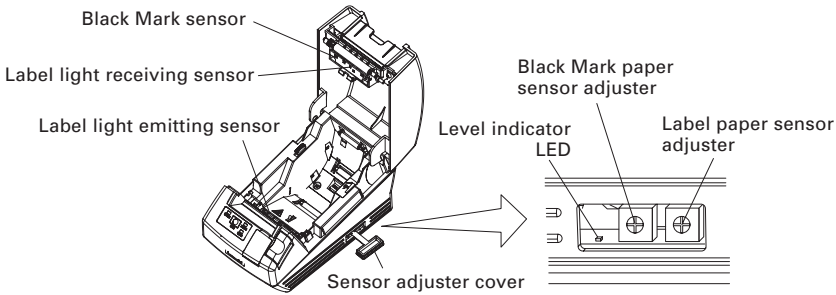


Figure 1

1 Enter Adjusting Paper Sensor mode.

Open the printer cover, remove paper, and then set the printer power switch to ON. Then close the printer cover while pressing the FEED button. Then, ERROR LED starts blinking, POWER LED goes off, and PAPER LED goes on.

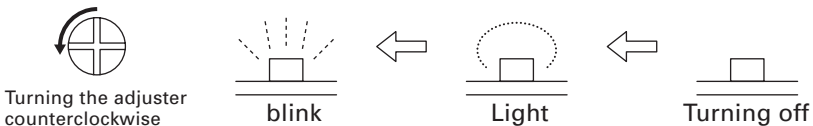
2 Set Paper to be adjusted to the Printer.

This printer has three types of built-in paper sensors.

In case of label, set it so that label is positioned on the label light receiving sensor and label light emitting sensor. In case of Black Mark paper, set it so that the printable portion (other than black mark) is positioned on the Black Mark sensor. In this case, closing the Printer cover causes ERROR LED to blink, POWER LED and PAPER LED go off.

3 Adjust Paper Sensor.

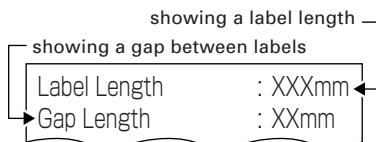
Using a narrow flat or Phillips screwdriver, turn the adjuster clockwise to let the LED go off. Then slowly turn the adjuster counterclockwise to set the LED to be lit. Excessively turning the adjuster results in blinking of the LED. In this case, return the adjuster to let the LED go on.



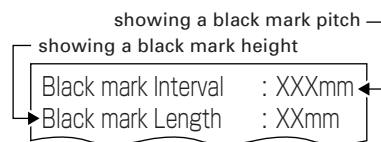
4 Perform Paper Measuring operation

When the FEED button is pressed, label is fed and paper measuring is carried. If the FEED button is pressed during the paper measuring, the result will be printed out as follows, and the printer memory switch will be initialized.

* The measuring result is a reference value



< Example of label measuring result >



< Example of black mark paper measuring result >

3.8 Full cutting label paper

When full-cutting the label paper with the printer installed horizontally, Be sure that the guide plate is mounted on the paper exit of the printer cover. (This guide plate was set to the printer at the time of factory shipment.) The Guide Plate prevents cut paper from dropping in the printer.

CAUTION!

- If about 10 sheets of cut paper accumulate on the paper exit, remove the paper.
- **Stacking of 10 or papers, paper jam may occur.**

● Mounting and Dismounting Guide Plate

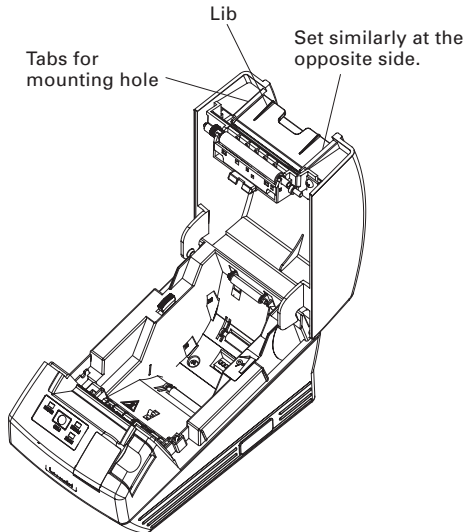
• Mounting

With the printer cover kept open, insert the tabs of the guide plate to one of the mounting holes (either right or left hole) located at the inside of the cover front. Set the guide plate with its lib facing toward you.

Then, with the guide plate warping toward you, insert the tabs to the mounting holes at the opposite side of the cover.

• Dismounting

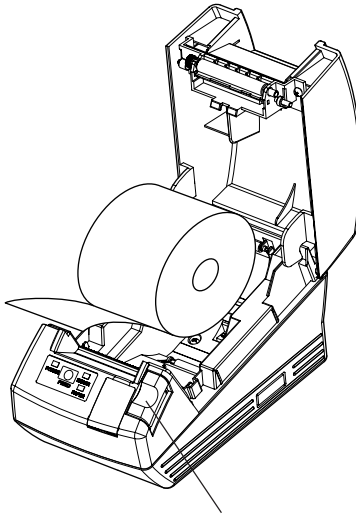
With the printer cover kept open, pull the center portion of the guide plate toward you to remove the guide plate.



4. MAINTENANCE AND TROUBLESHOOTING

4.1 Setting/Replacing Paper Rolls

1. Press the cover open button down.
2. Open the printer cover.
3. Insert a paper roll with the print surface facing down as shown on the figure below and pull the paper end out of the printer.
4. Close the printer cover until a click can be heard.



Cover open button

WARNING

- When opening the printer cover, take care not to touch the print head or cutter blade. Otherwise, burning or injury of hand may result.

CAUTION!

- Always use the specified types of paper roll.
- Confirm that the paper roll is set correctly.
- When the paper is skewed and not extended straightforward from under the cover, open the cover and adjust the paper correctly.
- When closing the cover, press on the both front sides marked or the center of the cover to close it firmly.
- When setting paper, pay attention not to let your fingers get injured by the edge of paper.
- When setting a label paper roll to the printer, be sure that there is no uneven portion on the roll paper side. If the roll paper side is uneven, set it evenly.

4.2 Removing Jammed Paper

1. Turn the printer power off.
2. Open the printer cover. If the cutter blade remains protruded with paper jammed, do not open the printer cover forcibly. Referring to section 4.4, restore the blade to the normal position and then open the cover.
3. Remove paper roll and clean the printer from any jammed paper or remaining small pieces of paper, then install the paper roll and close printer cover firmly.
4. Turn on the printer. The auto cutter mechanism is initialized and the alarm is cleared.



CAUTION!

- The print head is hot immediately after printing. Do not touch it with your hand. Do not touch the heating element of the head with a bare hand or metal object either.

4.3 Cleaning the Print Head

1. Turn the printer power off.
2. Open the printer cover.
3. Wait for several minutes and then wipe the dust or the like off the surface of head heating element using a cotton swab containing ethanol.
4. Head cleaning shall be done about once a month for standard paper. In case of label paper, clean the head about once every 10,000 sheets because the head is likely to catch the adhesive.



CAUTION!

- The print head is hot immediately after printing. Do not touch it with your hand. Do not touch the heating element of the head with a bare hand or metal object either.

4.4 When the Printer Cover Cannot Be Opened

Cutter lock error may occur with the Auto Cutter due to dropping of foreign object, paper jam, etc. If the cutter blade remains protruded with cutter lock error, the printer cover does not open.

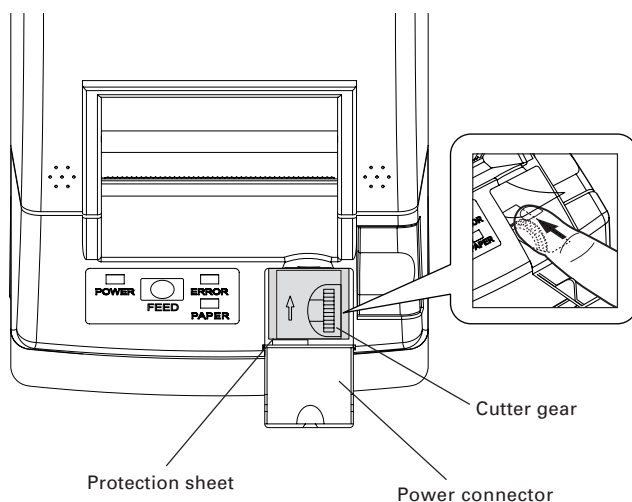
The Auto Cutter can also be restored to the initial position by turning the printer on again or by pressing the FEED button, when the memory SW3-1 is set to OFF.

If the cutter lock error cannot be recovered by the above method, release cutter lock in the following procedure.

1. Turn the printer power off.
2. If a cutter lock error occurs, the printer cover is held unopened. To open the cover, open the cutter gear cover on the front of the printer, turn the cutter gear under the protection sheet in the arrow direction, and return the movable blade to the initial position. (Return the movable blade to the position where the printer cover can open.)
3. Open the printer cover and remove the cause of the cutter lock.
4. Set paper correctly, close the printer cover, and turn the printer power on. (Check to make sure ERROR LED goes off.)

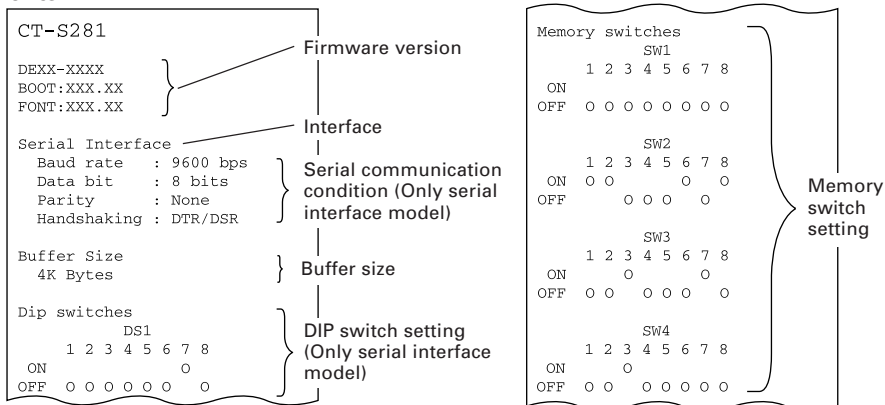
CAUTION!

- Do not touch the printer head by hand just after printing because high temperature remains on it.
- Do not touch the surface of the heating element of the print head by bare hand or by metal.
- Do not touch the blade of the cutter.



4.5 Self-printing

Insert paper into the printer. With the FEED button pressed and held, turn the printer power on, keep the FEED button held for about 1 second, and then release the FEED button. The printer starts self-printing. The printer prints model name, version, DIP switch setting, memory switch setting, and built-in fonts.



4.6 Hexadecimal Dump Printing

This function is to print all received data in hexadecimal numbers. If problems such as missing data, data duplication, etc. should occur, this function allows checking whether or not the printer is receiving data correctly. Set paper to the printer and keep the paper cover open.

With the FEED button pressed and held, turn the printer power on and then close the paper cover.

The printer prints "HEX dump print mode" followed by the received data printed in hexadecimal numbers and some characters.

CAUTION!

- The printer prints "." if there is no characters corresponding to data.
- During hexadecimal dump, functions except some command will be disabled.
- If print data does not cover a line, press the FEED button to print the line.

When you press the FEED button three times consecutively, or you turn the printer power off, or the printer receives a reset signal from the interface, the hexadecimal dump printing is terminated.

Print example

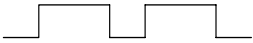








```

HEX DUMP PRINT MODE
1B 21 00 1B 20 04 41 42 43 44  . . . . ABCD
45 46 47 48 49 4A 4B 4C 4D 4E  EFGHIJKLMN
4F 50 0D 0A 31 32 33 0D 0A    OP..123..
  
```

4.7 Error Indication

- **Paper-end**
Paper empty is detected in two steps: paper-end and paper near-end(factory option). It causes the PAPER LED to light. If paper-end is detected, replace the paper roll.
- **Cover open error**
When the printer cover is opened, Printer cover open is detected and the ERROR LED goes on.
During printing, do not open the printer cover. If you open the printer cover accidentally, the ERROR LED blinks. Confirm the paper and close the cover. Printing resumes automatically.
- **Head overheat error**
When you print dense characters or dark image, the head temperature rises. If the head temperature exceeds a specified level, the printer stops printing operation and waits till the head temperature is lowered. During waiting, the ERROR LED blinks. When the head temperature is lowered, printing resumes automatically.
- **Cutter lock error**
If the cutter blade stops operating due to paper jam or the like, the ERROR LED blinks.
Remove the cause of the trouble and press the FEED button. If the blade does not move and the cover does not open yet even in the above procedure, follow the procedure in section 4.4 to open the paper cover.
- **Waiting for cutting label**
If cutter disabled is selected, label paper is ejected by the GS FF (print and eject blackmark paper/label paper) command and the printer is waiting for cutting label paper. (The printer is waiting for cutting by manual cutter or peeling label.)
If FEED SW is pressed, the printer returns to the print start position and is restored to normal state. When MSW3-7=OFF is set, if FEED SW is not pressed for more than 3 seconds (default), the printer performs the same operation as FEED SW is pressed.
- **Blackmark/label paper detection error**
If blackmark/label paper cannot be detected or non-standard paper is used, blackmark/label paper detection error occurs.
In this case, perform sensor adjustment in the sensor adjust mode. If adjustment is not successful regardless of the use of standard paper, faulty (degraded) sensor or the like is suspected. Contact our service agent.

The LED status of each error including the above is shown below.

Status	POWER LED	ERROR LED	PAPER LED
Paper-end	Lights	Lights	Lights
Paper near-end	Lights	Turning off	Lights
Cover open error	Lights	Lights	Turning off
Cover open error *1	Lights		Turning off
Cutter lock error	Lights		Turning off
Head overheat error	Lights		Turning off
Memory check error		Turning off	Turning off
Low voltage error	Lights		Turning off
High voltage error	Lights		Turning off
Macro execution wait *2	Lights		Turning off
Waiting for cutting label	Turning off		Lights
Blackmark/label paper detection error	Lights		Turning off

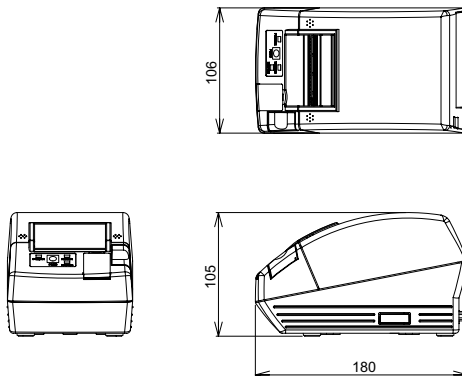
*1: When the printer is printing.

*2: The ERROR LED may blink even in the execution of macro function.

5. OTHER

5.1 External Views and Dimensions

(Unit: millimeter)



5.2 Manual Setting of Memory Switch

Memory switches can be set manually or by a command.

For manual setting, refer to the next page.

The function of each memory switch is shown in the following table. (The white-on-black characters are factory setting.)

Switch No.	Setting	0 (OFF)	1 (ON)
Memory SW1-1	Power ON Info	Valid	Not Send
SW1-2	Buffer Size	4k bytes	45 bytes
SW1-3	Busy Condition	Full/Err	Full
SW1-4	Receive Error	Print "?"	No Print
SW1-5	CR Mode	Ignored	LF
SW1-6	Reserved	Fixed	-
SW1-7	DSR Signal	Invalid	Valid
SW1-8	Reserved	Fixed	-
Memory SW2-1	Reserved	-	Fixed
SW2-2	Auto Cutter	Invalid	Valid
SW2-3	Spool Print	Invalid	Valid
SW2-4	Full Col Print	LineFeed	WaitData
SW2-5	Resume aft PE	Next	Top
SW2-6	Reserved	-	Fixed
SW2-7	Reserved	Fixed	-
SW2-8	PNE Sensor	* Valid	Invalid
Memory SW3-1	Resume Ctrr Err	Valid	Invalid
SW3-2	Reserved	Fixed	-
SW3-3	Reserved	-	Fixed
SW3-4	Reserved	Fixed	-
SW3-5	Reserved	Fixed	-
SW3-6	Reserved	Fixed	-
SW3-7	CBM-270 Mode	Invalid	Valid
SW3-8	Resume Open Err	Close	Command
Memory SW4-1 *1	P. Length Set	Auto Measure	Command
SW4-2 *2	Power on TOF	Invalid	Valid
SW4-3 *3	Feed&Cut at TOF	Invalid	Valid
SW4-4 *4	Paper Select	Thermal Roll	BM.P / Lbl.P
SW4-5 *5	Position detect	Black Mark	Label
SW4-6	C.Close Action	Find TOF	Auto Measure
SW4-7 *6	Auto paper Select	Invalid	Valid
SW4-8 *7	Partial Only	Invalid	Valid

*Factory option

Switch No.	Setting	0 (OFF)	1 (ON)
Memory SW5-1	Reserved	-	Fixed
SW5-2	Reserved	Fixed	-
SW5-3	USB Mode	Virtual COM	Printer Class
SW5-4	Reserved	Fixed	-
SW5-5	Reserved	Fixed	-
SW5-6*9	Auto Back Feed	After Cut	Before Print
SW5-7	Clear PNE LED	Auto	Set Paper
SW5-8	Reserved	Fixed	-

Switch No.	Setting	Default	Set Values
Memory SW7-1*8	Baud Rate	9600 bps	1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps
SW7-2	Data Length	8bits	7bits, 8bits
SW7-3	Stop Bit	1bit	1bit, 2bits
SW7-4	Parity	NONE	NONE, EVEN, ODD
SW7-5	Flow Control	DTR/DSR	DTR/DSR, XON/XOFF
SW7-6	Reserved	-	
SW7-7	VCom Protocol	PC Setting	PC Setting, DTR/DSR, XON/XOFF
Memory SW8-1	Reserved	-	
SW8-2	Paper Type	1 Color Normal	1 Color Normal, 2 Color Normal
Memory SW9-1	Code Page	PC437	PC437/Katakana/PC850,858/PC860/PC863/PC865/PC852/PC866/PC857/WPC1252/Space page/PC864/Thai Code 18
Memory SW9-2	Int' char Set	U.S.A	U.S.A, France, Germany, England, Denmark, Sweden, Italy, Spain, Japan, Norway, Denmark 2, Spain 2, Latin America, Korea, Croatia, China
Memory SW9-3	Kanji	OFF	ON, OFF
SW9-4	JIS/Shift JIS	JIS	JIS, Shift JIS
Memory SW10-1	Print Density	100%	70%, 75%, 80%, 85%, 90%, 95%, 100%, 105%, 110%, 115%, 120%, 125%, 130%, 135%, 140%
SW10-2	Print Speed	Level 9	Level 1, Level 2, Level 3, Level 4, Level 5, Level 6, Level 7, Level 8, Level 9
SW10-3	Reserved	-	
SW10-4	Reserved	-	

*1: When paper length setting is assigned as a command, use the command (GS1) when specifying paper layout. If there is no specification, paper length is set to default value. This is valid only when Blackmark paper/Label paper is selected with memory switch 4-4.

*2: Only valid when Blackmark paper/Label paper is selected with memory switch 4-4.

*3: No cutting operation occurs when cutter is disabled with memory switch 2-2.

When thermal paper roll is selected, cutting operation occurs after paper is fed by about 24mm.

When Blackmark paper/Label paper is selected, cutting operation occurs after paper feed to the top of the next print position.

*4: Paper select setting at the time of shipment depends on the model.

Standard: OFF (Thermal paper roll) Label: ON (Blackmark paper/Label paper)

*5: Valid only when Blackmark paper/Label paper is selected with memory switch 4-4.

Factory setting of paper position detection is subject to the model.

Standard: OFF (Blackmark detection) Label: ON (Label detection)

*6: MSW4-6/4-7 functions only when blackmark paper/label paper is selected by MSW4-4.

*7: Invalid when Blackmark paper/Label paper is selected with memory switch 4-4. (Only for full cut)

*8: Memory switch SW7-x setting is valid only when DIP switch No. 1 is OFF.

*9: Only valid when Blackmark paper/Label paper is selected with memory switch 4-4, and Label is selected with memory switch 4-5.

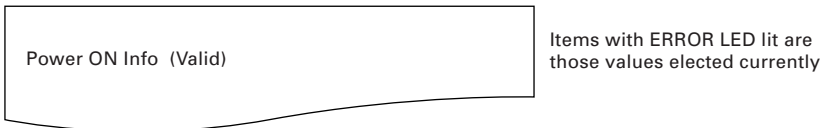
Manual Setting of Memory Switch (Memory SW)

The memory switch can be selected, changed, or written by the combination of three actions: pressing the FEED button, pressing and holding the FEED button, and opening or closing the printer cover.

1. Entering memory switch setting mode.
Set paper to the printer and keep the printer cover open. With the FEED button pressed and held, turn the printer power on, and then press the FEED button twice. Close the cover. If the current settings of the memory switch etc. are printed, the printer is now in the memory switch setting mode.



2. Selecting memory switch
When the FEED button is pressed button shortly (within 2 seconds), printing occurs in the order of "Memory SW1" → "Memory SW2" → "Memory SW3" → "Write/Factory Setting" → "Memory SW1" → repeatedly. When the memory switch you want to change is reached, press and hold the FEED button (for more than 2 seconds). The reserved memory switch setting will be skipped and not printed.
3. Selecting each switch item
There are eight setting items for each switch. Press and hold the FEED button continuously, the printer goes to the next item and prints the current setting of the item. Repeat pressing and holding till the item you want to change setting is reached.



4. Changing the setting
When the item you want to change is reached, press the FEED button shortly. The changed set value is printed. (To return to the previous setting press the FEED button shortly). When you press the FEED button continuously, the set value is accepted and then the printer goes to the next setting item.
5. Returning to the memory switch select mode
When the setting of the desired content is completed, open the printer cover and then close the printer cover. This allows the printer to print the setting of the changed memory switch.

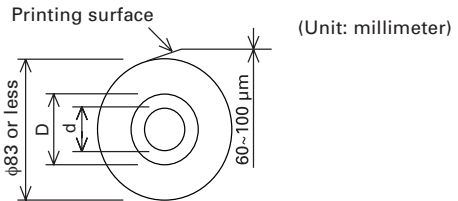
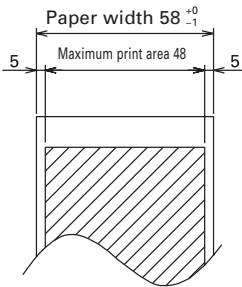
6. Saving the setting and exiting the memory switch setting mode
 Press the FEED button shortly to move to "Write/Factory Setting". Then press and hold the FEED button. The printer prints the content of new setting and exits the memory switch setting mode to return to the normal standby state.
 * Unless saving the setting is executed, the changed setting cannot be enabled.
7. Initializing the memory switch
 When you want to return the memory switch setting to the initial state, go to "Write/Factory Setting" in the above procedure. Here, open the paper cover and press and hold the FEED button till buzzer sounds. This allows the printer to return to the initial state.
 * All the memory switches settings are returned to the factory set values.

5.3 Printing Paper

a) Thermal paper

Use the print paper shown in the following table or the paper with equivalent quality.

Paper Type	Product Name
Recommended thermal paper roll	TF50KS-E2D, TF77KS-EY from Nippon Paper PD160R from Ohji Paper F230AA, PB670 (2-color) from Mitsubishi Paper



Paper thickness t (μm)	d	D
$60\mu\text{m} \leq t \leq 75\mu\text{m}$	φ12	φ18
$75\mu\text{m} < t \leq 100\mu\text{m}$	φ25.4	φ32

CAUTION!

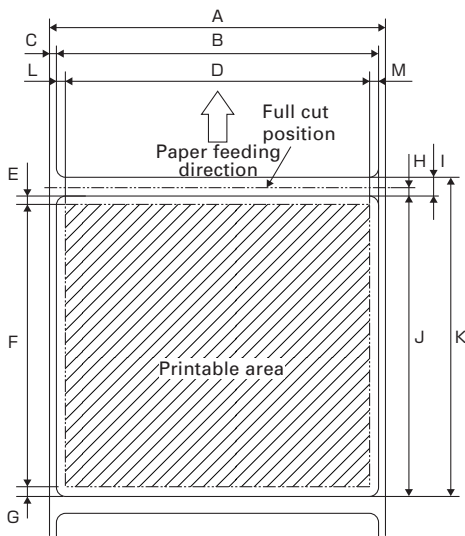
Use the paper with the start of winding to roll core is as shown below.

- No fold line is present and paper is along the inner diameter.
- No turnup is present.
- No pasting to core is present.
- Outer winding (print side out) is used.

When using “label paper” with CT-S281XL/OL, refer to the following. Use the following paper or the equivalent paper.

Paper type	Product name
Recommended thermal label paper	HD75 from Nippon Paper 150HBW from Ricoh

b) Label paper



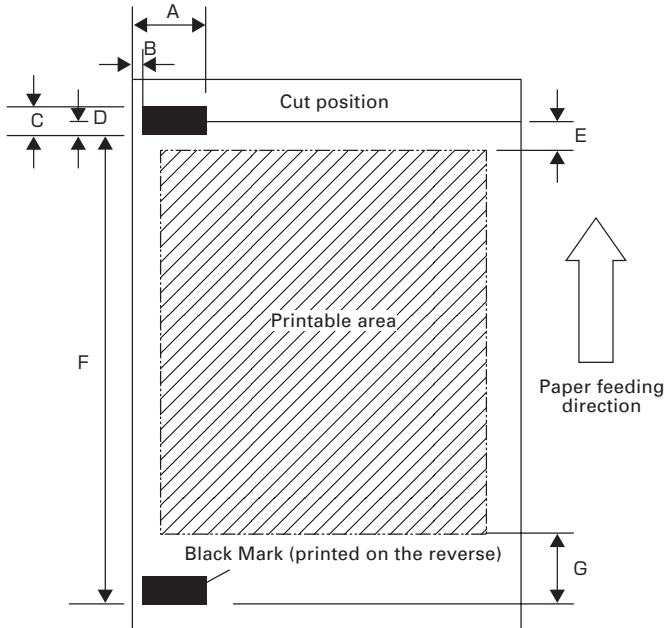
Unit: mm

Mark	Item	Dimensions
A	Liner width	58_{-1}^0
B	Label width	54 ± 0.5
C	Left edge of label	2 ± 0.5
D	Print width	48
E	Top margin	2 ± 1
F	Print length	$21 \text{ to } 156 \pm 1$
G	Bottom margin	2 ± 1
H	Cut position between labels	2 or more
I	Gap between labels	5 ± 1
J	Label length	25 to 160
K	Label pitch	$I+J$
L	Left margin	3 ± 1
M	Right margin	3 ± 1

CAUTION!

- Do not use full sheet label paper.
- Use label paper with peel force of 200 mN/50mm between label and liner. Using label paper with weak peel force may result in paper jam.
- In some case, adhesive may be present between label papers or at the edge of label. Fixing adhesive on the paper path such as print head, etc. may result in paper jam. At the occurrence of paper jam, check for fixed adhesive. Remove the fixed adhesive using close moistened with ethanol.
- When label length is less than 30 mm and the cutter is set to be disabled, feeding the unlabelled area to the manual cut position and then to the first print position by using the GS FF command may cause label paper to feed one or two sheets without printing.
- Observe the life and storage condition of label paper when using label paper.

c) Black mark paper (BM paper)



Unit: mm

Mark	Item	Dimensions
A	Right edge of black mark	15 or more
B	Left edge of black mark	0 to 1.5
C	Black mark height	5
D	Cut position in black mark	2.5
E	Top margin	7 ± 1
F	Black mark pitch	30 to 165
G	Bottom margin	7 ± 1

! CAUTION!

- 1) PCS value of black mark must be 0.9 or more.
- 2) When using the black mark paper, consider the margin of ± 2 mm for the print position against the standard position and ± 5 mm for print length.
- 3) Refer to the above drawing for the printable area and have enough margins specified in the marks E and G. If the print data size is out of the printable area, the printer should skip to next page.
- 4) When using preprinted paper, consider the layout of the paper.

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